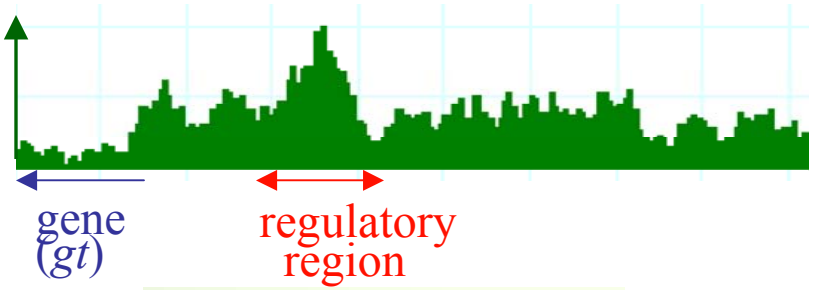
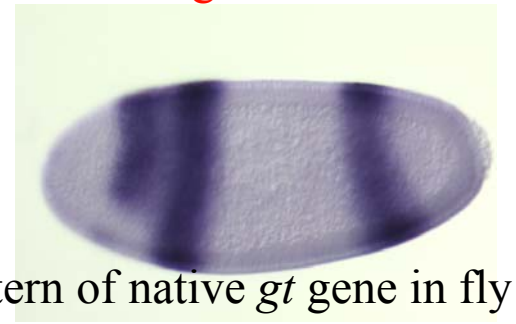
Reading the Fly Genome for Gene Regulatory Modules

Eric Siggia, Cornell University DMR 0129848

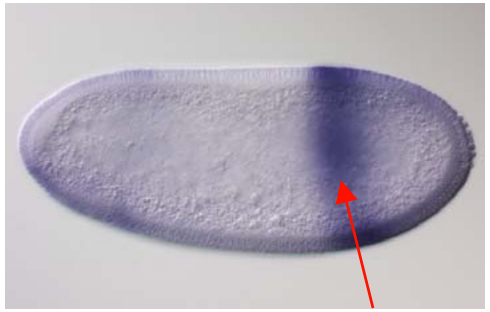
The genome encodes both the 'parts list' of an organism, as well as the instructions to assemble it. The body of the fly is built from 14 segments that are defined during the first few hours of life by a cascade of regulatory proteins. Using algorithms borrowed from statistical physics we have modeled the regulatory regions where the clusters of these proteins bind. The effect of these regions was then visualized in transgenic flies. The regions' patterns repeated in space and time a portion of the native pattern. Schroeder et al *PLoS Biology* Sept 2004

'Free energy' of regulatory clusters along the genome





Pattern of native *gt* gene in fly embryo



Pattern of reg. region only, hooked to marker recapitulates posterior stripe